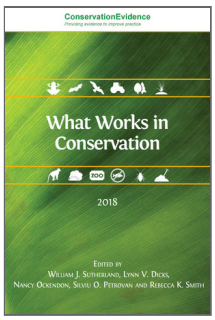

William J. Sutherland, Lynn V. Dicks, Nancy Ockendon, Silviu O. Petrovan and Rebecca K. Smith (dir.)

What Works in Conservation 2018

Open Book Publishers

10.3 Threat: Invasive crustaceans

Publisher: Open Book Publishers
Place of publication: Open Book Publishers
Year of publication: 2018
Published on OpenEdition Books: 21 March 2019
Serie: OBP collection
Electronic ISBN: 9791036524547

10.3 Threat: Invasive crustaceans

10.3.1 Ponto-Caspian gammarids

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for controlling Ponto-Caspian gammarids?	
Likely to be beneficial	• Change salinity of the water • Change water temperature • Dewatering (drying out) habitat • Exposure to parasites
Unlikely to be beneficial	• Add chemicals to water • Change water pH • Control movement of gammarids
No evidence found (no assessment)	• Biological control using predatory fish • Cleaning equipment • Exchange ballast water • Exposure to disease-causing organisms

Likely to be beneficial

Change salinity of the water

One of two replicated studies, including one controlled study, in Canada and the UK found that increasing the salinity level of water killed the majority of invasive shrimp within five hours. One found that increased salinity did not kill invasive killer shrimp. *Assessment: likely to be beneficial (effectiveness 40%; certainty 50%).*

https://www.conservationevidence.com/actions/1091

Change water temperature

A controlled laboratory study from the UK found that heating water in excess of 40°C killed invasive killer shrimps. *Assessment: likely to be beneficial (effectiveness 80%; certainty 50%).*

https://www.conservationevidence.com/actions/1092

Dewatering (drying out) habitat

A replicated, controlled laboratory study from Poland found that lowering water levels in sand (dewatering) killed three species of invasive freshwater shrimp, although one species required water content levels of 4% and below before it was killed. *Assessment: likely to be beneficial (effectiveness 60%; certainty 50%).*

https://www.conservationevidence.com/actions/1094

Exposure to parasites

A replicated, controlled experimental study in Canada found that a parasitic mould reduced populations of freshwater invasive shrimp. *Assessment: likely to be beneficial (effectiveness 50%; certainty 50%).*

https://www.conservationevidence.com/actions/1089

Unlikely to be beneficial

Add chemicals to water

A controlled laboratory study from the UK found that four of nine substances added to freshwater killed invasive killer shrimp, but were impractical (iodine solution, acetic acid, Virkon S and sodium hypochlorite). Five substances did not kill invasive killer shrimp (methanol, citric acid, urea, hydrogen peroxide and sucrose). *Assessment: unlikely to be beneficial (effectiveness 35%; certainty 60%).*

https://www.conservationevidence.com/actions/1095

Change water pH

A controlled laboratory study from the UK found that lowering the pH of water did not kill invasive killer shrimp. *Assessment: unlikely to be beneficial (effectiveness 0%; certainty 50%).*

https://www.conservationevidence.com/actions/1093

Control movement of gammarids

Two replicated studies, including one controlled study, in the USA and UK found that movements of invasive freshwater shrimp slowed down or were stopped when shrimp were placed in water that had been exposed to predatory fish or was carbonated. *Assessment: likely to be beneficial (effectiveness 20%; certainty 40%).*

https://www.conservationevidence.com/actions/1088

No evidence found (no assessment)

We have captured no evidence for the following interventions:

- Biological control using predatory fish
- Cleaning equipment
- Exchange ballast water
- Exposure to disease-causing organisms.

10.3.2 *Procambarus* spp. crayfish

Based on the collated evidence, what is the current assessment of the effectiveness of interventions for controlling *Procambarus* spp. crayfish?	
Likely to be beneficial	• Add chemicals to the water • Sterilization of males • Trapping and removal • Trapping combined with encouragement of predators
Unknown effectiveness (limited evidence)	• Create barriers
Unlikely to be beneficial	• Encouraging predators
No evidence found (no assessment)	• Draining the waterway • Food source removal • Relocate vulnerable crayfish • Remove the crayfish by electrofishing

Likely to be beneficial

Add chemicals to the water

One replicated study in Italy found that natural pyrethrum at concentrations of 0.05 mg/l and above was effective at killing red swamp crayfish both in the laboratory and in a river, but not in drained burrows. *Assessment: likely to be beneficial (effectiveness 80%; certainty 50%; harms 0%).*

https://www.conservationevidence.com/actions/1036

Sterilization of males

One replicated laboratory study from Italy found that exposing male red swamp crayfish to X-rays reduced the number of offspring they produced. *Assessment: likely to be beneficial (effectiveness 50%; certainty 40%; harms 0%).*

https://www.conservationevidence.com/actions/1032

Trapping and removal

One controlled, replicated study from Italy found that food (tinned meat) was a more effective bait in trapping red swamp crayfish, than using pheromone treatments or no bait (control). Baiting with food increased trapping success compared to trapping without bait. *Assessment: likely to be beneficial (effectiveness 40%; certainty 60%; harms 0%).*

https://www.conservationevidence.com/actions/1029

Trapping combined with encouragement of predators

One before-and-after study in Switzerland and a replicated, paired site study from Italy found that a combination of trapping and predation was more effective at reducing red swamp crayfish populations than predation alone. *Assessment: likely to be beneficial (effectiveness 50%; certainty 50%; harms 0%).*

https://www.conservationevidence.com/actions/1031

Unknown effectiveness (limited evidence)

Create barriers

One before-and-after study from Italy found that the use of concrete dams across a stream was effective at containing spread of the population upstream. *Assessment: unknown effectiveness (effectiveness 30%; certainty 30%; harms 0%).*

https://www.conservationevidence.com/actions/1037

Unlikely to be beneficial

Encouraging predators

Two replicated, controlled studies in Italy found that eels fed on the red swamp crayfish and reduced population size. One replicated, controlled study found that pike predated red swamp crayfish. *Assessment: unlikely to be beneficial (effectiveness 30%; certainty 60%; harms 0%).*

https://www.conservationevidence.com/actions/1030

No evidence found (no assessment)

We have captured no evidence for the following interventions:

- Draining the waterway
- Food source removal
- Relocate vulnerable crayfish
- Remove the crayfish by electrofishing.